

IN THE CLAIMS

JC17 Rec'd PCT/PTO 01 JUN 2005

This is a complete and current listing of the claims, marked with status identifiers in parentheses. The following listing of claims will replace all prior versions and listings of claims in the application.

1. (Currently Amended) A method for transporting electrically charged molecules in an aqueous solution, ~~in particular during the operation of a DNA sensor with a redox cycling process between two measuring electrodes, characterized by the following measures~~ the method comprising:  
~~arranging, in the vicinity of the two measuring electrodes, a metallic material which is resistant in the aqueous electrolyte and is more electronegative than that of the measuring electrode, the metallic material being~~ is arranged as an electrode to which a potential can be applied,  
; and  
~~bringing the metallic material, as a result of a positive potential being applied to the arranged electrode, the metallic material is brought~~ into solution as positive ions,  
~~whereby negatively charged molecules are transported as target molecules in the opposite direction and are enriched at the measuring electrodes.~~

2. (Currently Amended) The method as claimed in claim 1,

~~characterized in that~~ wherein the metal ions going into solution are complexed by the presence of a complexing agent, whereby their concentration is kept low and virtually constant.

3. (Currently Amended) The method as claimed in claim 12 or 2, ~~characterized in that~~ wherein copper is used as the metallic material, said the copper forming a copper sacrificial anode.

4. (Currently Amended) The method as claimed in claims 23 and 3, ~~characterized in that~~ wherein histidine is used as a complexing agent for complexing the copper ion.

5. (Currently Amended) The method as claimed in ~~one of claims 1 to 4~~, ~~characterized in that~~ claim 1, wherein catcher molecules at an electrode surface are used for detecting the target molecules.

6. (Currently Amended) The method as claimed in claim 5, ~~characterized in that~~ wherein thiol-modified capture molecules are used as capture molecules.

7. (Currently Amended) The method as claimed in claim 5, ~~characterized in that~~ wherein hydrogel-bound molecules are used as capture molecules.

8. (Currently Amended) The method as claimed in ~~one of the preceding claims, characterized in that claim 1, wherein~~ an electrophoresis method is performed.

9. (Currently Amended) The method as claimed in ~~one of the preceding claims, characterized in that claim 1, wherein~~ a DNA analysis of DNA fragments is effected.

10. (Currently Amended) The method as claimed in claim 9, ~~characterized in that wherein~~ the enriched molecules are detected as target molecules during the DNA analysis.

11. (Currently Amended) The method as claimed in claim 8—or 9, ~~characterized in that wherein~~ the selectivity of the process is increased by polarization of the electrodes used for the electrophoresis or DNA analysis.

12. (Currently Amended) A method for binding-specific separation of electrically charged molecules in an aqueous solution, ~~in particular~~ during the operation of a ~~DNA~~-sensor with a ~~redox~~-cycling process between two measuring electrodes, ~~, characterized by the following measures~~ the method comprising:

~~— situating metal ions are situated in the aqueous solution;~~

~~— depositing, as a result of a negative potential being~~

applied to the measuring electrodes, the metal ion is deposited as metal at the measuring electrodes, whereby negatively charged molecules bound in the vicinity of the measuring electrodes are transported away from the measuring electrodes as target molecules with a sufficiently low binding energy.

13. (Currently Amended) The method as claimed in claim 12, characterized in that wherein copper is used as metal ions and gold is used as measuring electrodes.

14. (Currently Amended) The method as claimed in claim 12, characterized in that wherein the molecules transported away from the measuring electrodes are those target molecules which are not intended to be detected during the-a DNA analysis.

15. (Currently Amended) A device for carrying out the method as claimed in claim 1 or one of claims 2 to 10, or for carrying out the method as claimed in claim 12 or one of claims 13, 14, having an arrangement comprising the measuring electrodes (20, 30) for electrochemical measurement in an aqueous solution-(15), there being present in the aqueous solution at least one of metal ions or-and accumulations (40) of metal made of more electronegative material than that of the measuring electrodes-(20, 30), the material being resistant in aqueous solution-(15).

16. (Currently Amended) The device as claimed in claim 15,  
~~characterized in thatwherein~~ the measuring electrodes ~~(20, 30)~~  
comprise noble metal, ~~in particular gold.~~

17. (Currently Amended) The device as claimed in claim 15,  
~~characterized in thatwherein~~ the metal is copper and forms a  
sacrificial electrode ~~(40).~~

18. (Currently Amended) The device as claimed in claim 16,  
~~characterized in thatwherein~~ the measuring electrodes made of  
gold have a sensor surface ~~(21, 31)~~—to which capture molecules  
for the target DNA ~~(200)~~—are bound.

19. (Currently Amended) The device as claimed in ~~one of~~  
~~claims 15, 16 or 18,~~ ~~characterized in thatwherein~~ the  
measuring electrodes ~~(20, 30)~~—form an interdigital structure  
~~comprising—including~~ comb electrodes ~~(82, 83)~~—with  
intermeshing electrode fingers.

20. (Currently Amended) The device as claimed in claim 17,  
~~characterized in thatwherein~~ the sacrificial electrode ~~(84)~~—is  
arranged annularly around the comb electrodes ~~(82, 83)~~.

21. (Currently Amended) The device as claimed in claim 15,  
~~characterized in thatwherein~~ a hydrogel layer ~~(35)~~—for binding

the capture molecules (100) is arranged on the measuring electrodes (20, 30).

22. (Currently Amended) The device as claimed in claim 15, characterized in that wherein the measuring electrodes (20, 30) are assigned separate reaction areas (30) for attachment of the capture molecules (100).

23. (Currently Amended) The device as claimed in claim 19, characterized in that wherein an array (80) having m rows and n columns is formed by individual interdigital structures (80, 80', ...) with sacrificial electrode (84).

24. (Currently Amended) The device as claimed in claim 23, characterized in that wherein an auxiliary electrode (185) with respect to the individual sacrificial electrodes (84) runs annularly around the m:n array (180).

25. (New) The method as claimed in claim 1, wherein the method is for transporting electrically charged molecules in an aqueous solution during the operation of a DNA sensor with a redox cycling process between the two measuring electrodes.

26. (New) The method as claimed in claim 1, wherein copper is used as the metallic material, the copper forming a copper sacrificial anode.

27. (New) A device for carrying out the method as claimed in claim 12, having an arrangement comprising the measuring electrodes for electrochemical measurement in an aqueous solution, there being present in the aqueous solution at least one of metal ions and accumulations of metal made of more electronegative material than that of the measuring electrodes, the material being resistant in aqueous solution.

28. (New) The device as claimed in claim 16, wherein the measuring electrodes form an interdigital structure including comb electrodes with intermeshing electrode fingers.

29. (New) The device as claimed in claim 18, wherein the measuring electrodes form an interdigital structure including comb electrodes with intermeshing electrode fingers.